Phthorimaea Lycopersicella, new species (Family Gelechiidae) a Leaf Feeder on Tomato. (Lep.)

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The species here described has been mistaken for, and has been identified in the economic literature* as the very similar species, *Phthorimaea glochinella* (Zeller), which occasionally is injurious to eggplant in the eastern part of the United States. The writer must plead guilty to the major part of this confusion, which was reasonably excusable as long as coloration was mainly relied upon in the differentiation of these obscurely marked species.

The mistake was the more natural because the allied well-known cosmopolitan species *P. operculella* (Zeller) feeds on both tomato and eggplant, as well as on potato and tobacco, and on its original foodplant *Solanum carolinense.*

But with the study of their genitalia it became apparent that we had to deal with two distinct species, of which the one, *P. glochinella,* at present at least is confined to the eastern and southern parts of the United States, east of the Rocky Mountains, while the species here described, *P. lycopersicella,* occurs in California, extending into Sinaloa, Mexico, and has in very recent years been introduced accidentally into the Hawaiian Islands, where it already appears to be well established.

I am under obligation to my friend, O. H. Swezey, for abundant, carefully reared material of this species which has enabled proper identification. I suggested to Mr. Swezey, who has added so much to our knowledge of the Hawaiian fauna, that he describe the species himself, but he has insisted that I must do so, and inasmuch as it affords me opportunity to correct my own mistake, I am glad to do it, the more so because Mr. Swezey will add his notes on the biology of the species.

Phthorimaea lycopersicella n. sp.

Alar expanse: 9-12 mm. Labial palpi with short furrowed brush on underside of second joint, terminal joint somewhat thickened with scales,

* T. H. Jones, Journ. Agr. Res., vol. 26, p. 567, 1922; E. O. Essig, Insects Western North America, p. 717, 1926.

compressed with extreme tip pointed, slightly projecting above the scaled part; ochreous white, externally mottled with dark fuscous; terminal joint with a faint ill-defined fuscous annulation before the tip and with extreme apex fuscous. Face and tongue ochreous white. Head and thorax mottled with fuscous. Antennae yellowish fuscous with narrow, dark fuscous annulations. Forewings elongate ovate, apex bluntly pointed, termen oblique; venation typical of the genus, 12 veins, 2-6 separate, equidistant, 7 and 8 stalked to costa; ground color ochreous gray, heavily overlaid and mottled with dark fuscous scaling, and with ill-defined and indistinct, broken, longitudinal, ochreous streaks; discal stigmata hardly indicated; plical spot on middle of fold faint and ill-defined, blackish; cilia ochreous gray. Hindwings with apex pointed, produced; termen deeply sinuated; 8 veins, 3 and 4 connate, 5 approximate, 6 and 7 parallel; light ochreous fuscous; a strong pencil of hair-scales, dilated at tip, from base of costa in the males, reaching to beyond middle of wing, yellowish. Abdomen dark fuscous above with two basal joints slightly lighter, ochreous, underside light ochreous, sprinkled with fuscous. Inner side of legs light ochreous, outer side heavily barred with dark fuscous.

This species is hardly distinguishable in color from *P. glochinella,* which, however, averages slightly larger and darker, and which sometimes has the discal stigmata faintly indicated; the male hair-pencil in this species is, though well-developed, much smaller than in *lycopersicella,* and the hairs are not dilated at tip. The genitalia, on the other hand, give clear-cut characters of differentiation in both sexes as shown in figs. 2, 3, 5 and 7. The plates of the eighth abdominal segment, which cover the male genitalia when at rest, are nearly alike in the two species. The uncus is long and hookshaped in both species (very different from the short hoodlike uncus of the type of the genus, *P. operculella,* the genitalia of which are given for comparison [Figs. 1 and 4], but it is much longer and more curved in *glochinella* than in *lycopersicella.* The gnathos is weak, pending in thin arms from pointed projections of the tegumen. The vinculum has a very long and slender anterior process; in *glochinella* this process is rather short and stout. The anellus is a broad plate with a central and two lateral processes supporting the aedoeagus. The aedoeagus is very long and slender with strongly chitinized, thorned apex and terminates basally in a globular bulb into which the penis tube enters through a lateral circular hole. The harpes are long, slender, sinuate, enlarged and forked at the tip. This last character furnishes the easiest offhand distinction between the two species, as it may be ascertained under the binoculars or even with a good hand lens without making a slide of the genitalia, merely by moistening the parts in situ.

P. operculella (Zeller), the type of the genus, is easily differentiated in male genitalia (fig. 1) by the hoodlike uncus and the large tonguelike gnathos with the bulbous base, as well as by the extravagantly developed eighth abdominal joint.

The female genitalia have the flattened lobes of the ovipositor bent towards and facing each other so as to form a partial tube; the genital plate is small, transverse, deeply sinuated posteriorly on both sides of the genital opening; it is laterally fused with the chitinous parts of the penultimate joint and with its supporting internal rods, which appear part of the plate, as is normal in the family Gelechiidae; it is continued into a strongly

chitinized upper part of the genital tube, which shortly beyond this part terminates in the large, oblong oval bursa copulatrix, in the upper third of which is a thornlike, strongly curved signum. *P. glochinella* has a larger, more rectangular and less sinuated genital plate, and the signum is very robust, nearly twice as large but less curved than that of *lycopersicella*. *P. operculella* (fig. 4) is at once distinguished by the scobinated anal half of the genital plate, which terminates in two small posterior teatlike papillae; though the larger species, its signum is smaller than in the two smaller species.

Described from ten specimens of both sexes reared from larvae feeding on tomato, Oahu, Hawaiian Islands, February, March, and August. (O. H. Swezey.)

Type—U. S. Nat. Museum Cat. No. 40856.

Cotypes—In collection of the Hawaiian Entomological Society, Honolulu, Hawaii.

Paratypes and other exponents of this species, also reared from tomato, from California and Sinaloa, Mexico, in U. S. National Museum.

P. glochinella and *P. lycopersicella* are clearly congeneric, but the writer is doubtful about the propriety of retaining them in the genus of which *Phthorimaea operculella* (Zeller) is the type. The long hook-like uncus of these two and other allied species is an uncommon character in the family Gelechiidae and harmonizes very poorly with the short hood-like uncus of *P. operculella*, which in this and other respects is more like the allied genus Gnorimoschema Busck. In fact the writer is not yet satisfied about the limitations of these two genera.* The characters used

* My friend, Mr. Edward Meyrick, the author of the genus Phthorimaea, appears to be similarly undecided from his shifting several of his South American species from one genus to the other, and Mr. Alfred Philpott of the Cawthron Institute, New Zealand, has pointed out (Trans. N. Z. Institute, vol. 58, p. 349, 1927.) that *operculella* departs considerably, in genitalia, from other New Zealand species included in the genus. I have not had opportunity to examine these New Zealand species, but I find that most of the European species referred to the genus, though also differing in details from the type, may still be properly included (*streliciella* H. Sch.; *psilella* H. Sch.; *artimisiella* Tr.; *obsoletella* F. & R. and others). The Indian tobacco pest, *P. heliopa* Lower, is also correctly included with *P. operculella; operculella* differs, however, from all of these allies by the absence of a chitinized hooked termination to the tonguelike gnathos and the much longer slender aedoeagus, as well as in the possession of a strong hair-pencil at the base of the hindwings of the male, which secondary sexual character was at one time, alone, considered sufficient to establish the genus as distinct from Gnorimoschema.

hitherto—the clothing of the labial palpi, the more or less true parallelism of veins 6 and 7 in the hindwings, and the basal costal hair-pencil on the hindwings of the male—in which characters the two present species partake—do not suffice to arrange the species referred to the two genera according to their natural affinities. Much additional study is required to define these two (or more) genera properly, but in the meantime the two species dealt with in this paper, and their American allies, may be temporarily retained in Phthorimaea, which they resemble so much in color and general habitus, as well as in the characters hitherto considered sufficient for generic differentiation.

The drawings of the genitalia were made under the writer's direction by Miss Eleanor T. Armstrong of the U. S. Bureau of Entomology, and I am under obligation to her for her careful and intelligent execution of them.

The curiously similar namesake, *lycopersicella* Walsingham (Proc. Zool. Soc. London, p. 71, 1897), which feeds similarly on tomato in St. Croix, West Indies, and which also has a hair-pencil at base of the hindwing of the male, belongs to the genus Aristotelia as proven by the types in British Museum and in collection Gudmann, Copenhagen.

Explanation of Plates

MALE GENITALIA

Figure 1. *Phthorimaea operculella* Zeller.
Figure 2. *Phthorimaea glochinella* Zeller.
Figure 3. *Phthorimaea lycopersicella* Busck.

FEMALE GENITALIA

Figure 4. *Phthorimaea operculella* Zeller.
Figure 5. *Phthorimaea glochinella* Zeller.
Figure 7. *Phthorimaea lycopersicella* Busck.
Figure 6. *Phthorimaea lycopersicella*—Wings of male.

Terms Used in the Figures

MALE GENITALIA

Vm—vinculum
An—anellus
Ae—aedoeagus
Hp—harpes
U—uncus
Gn—gnathos
Tg—tegumen

FEMALE GENITALIA

Op—ovipositor
Pl—genital plate
Go—genital opening
Db—ductus bursae
Bc—bursa copulatrix
Sm—signum

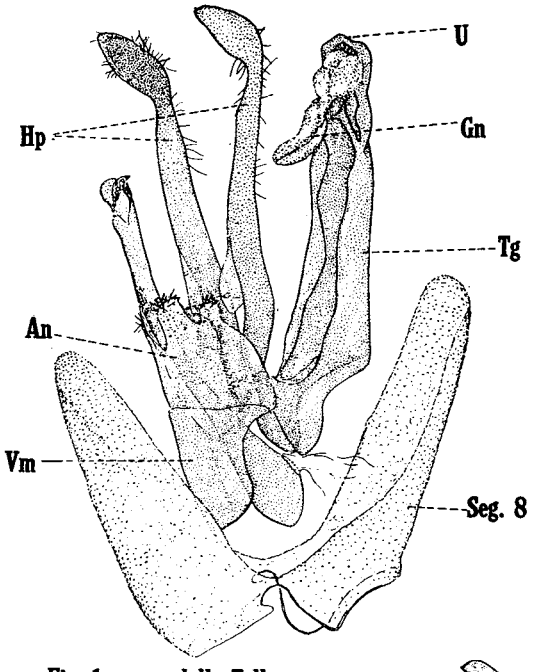

Fig. 1 operculella Zeller

Fig. 2 glochinella Zeller

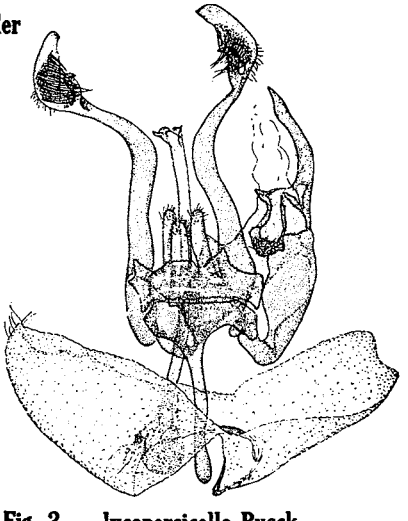

Fig. 3 lycopersicella Busck

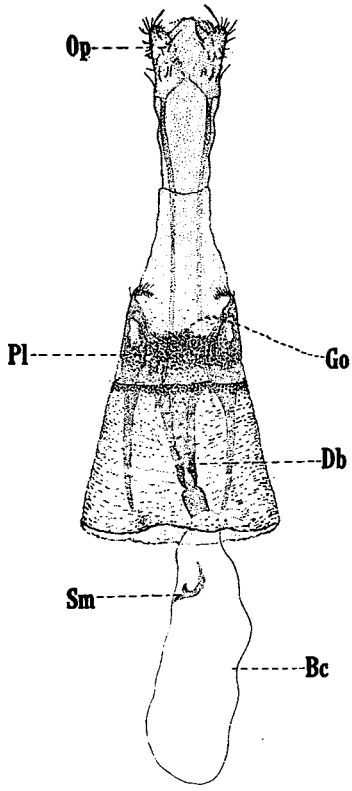

Fig. 4 operculella Zeller

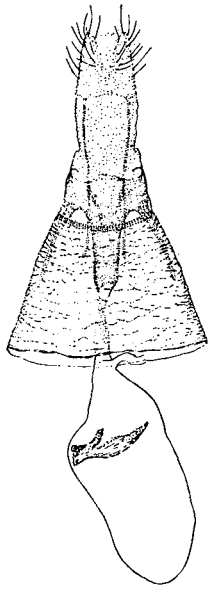

Fig. 5 glochinella Zeller

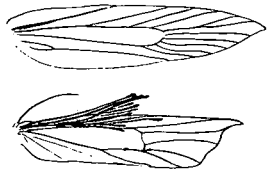

Fig. 6 lycopersicella Busck

Fig. 7 lycopersicella Busck